

DESCRIPTION

VEHICLE TO ASSIST WALKING

Technical Field

- 5 The invention relates to a vehicle to assist walking having a function to help a person walk, and a function to help move a person.

Background Art

- 10 A vehicle to assist walking for assisting a person with disabled legs to walk is known. Such a vehicle to assist walking is disclosed for example in Japanese Unexamined Patent Publication No.6-39007. The vehicle to assist walking disclosed in this publication comprises an
- 15 upper frame which extends rearwards from the front side of the user to the lateral sides thereof, a lower frame which extends rearwards from the front side of the user to the lateral sides thereof, and connecting frames which connect the upper and lower frames. Front wheels are
- 20 mounted on the lower frame at the front area thereof, and rear wheels are mounted on the upper frame at the rear area thereof. The user can stand within a space surrounded by the upper and lower frames and walk while user's body is supported by the upper frame.

- 25 The user uses such a vehicle to assist walking to move to a destination or for rehabilitation. During walking, the user may become exhausted and thus need to take a rest without using the user's legs even if the user uses the vehicle to assist walking since the user's
- 30 legs are disabled. In this case, in consideration of the relief of the user during walking, it is preferable to be able to rest on the vehicle to assist walking. In the vehicle to assist walking disclosed in the above mentioned publication, however, the user cannot rest
- 35 without using the user's legs.

 Further, it is preferable to use the vehicle to assist walking as a support for the body of the user when

09869883-081701

5

10

15

20

25

35

5

10

15

20

25

35

invention, the seat plate comprises a pair of seat plate portions, and the seat plate portions can project from each lateral side of the user to the area where the legs of the walking user move, and the level of the seat plate portions is higher than that of the seat of the stool and the seat plate portions form a space therebetween when the seat plate portions project to the area where the legs of the walking user move.

10 Brief Description of Drawings

Fig.1 is a side view of an embodiment of the invention;

Fig.2 is a front view of the embodiment shown in Fig.1;

15 Fig.3 is a plan view of a seat plate of the embodiment shown in Fig.1;

Fig.4 is a plan view, similar to Fig.3, of a seat plate of a second embodiment;

20 Fig.5 is a plan view, similar to Fig.3, of a seat plate of a third embodiment;

Fig.6 is a plan view, similar to Fig.3, of a seat plate of a fourth embodiment;

Fig.7 is a plan view, similar to Fig.3, of a seat plate of a fifth embodiment;

25 Fig.8 is a plan view, similar to Fig.3, of a seat plate of a sixth embodiment;

Fig.9 is a plan view, similar to Fig.3, of a seat plate of a seventh embodiment;

30 Fig.10 is a plan view, similar to Fig.3, of a seat plate of an eighth embodiment;

Fig.11 is a plan view, similar to Fig.3, of a seat plate of a ninth embodiment;

Fig.12 is a back view of a handle formed in a different manner from a handle shown in Fig.1.

35

Best Mode for Carrying Out the Invention

In the below, the invention will be explained in

09869883-081701
T0780" 088698860

detail with reference to embodiments shown in the drawings. Fig.1 shows a side view of an embodiment of a vehicle to assist walking of the invention, and Fig.2 shows a front view of the embodiment shown in Fig.1.

5 Note that, below, for the sake of convenience in the explanation, the right side in Fig.1 is referred to as "front", the left side in Fig.1 is referred to as "rear", the upper side in Fig.1 is referred to as "upper", the lower side in Fig.1 is referred to as "lower", and the
10 left and right sides in Fig.2 are referred to as "lateral". Further, in Fig.2, the term "upper" refers to the upper side, and the term "lower" refers to the lower side.

As shown in Fig.1, the vehicle of the embodiment
15 comprises a frame 1 which extends to surround the user. The frame 1 has an upper frame 2, a lower frame 3, and connecting frames 4 for connecting the upper and lower frames 2 and 3.

The upper frame 2 is generally U-shaped and extends
20 from the front area of the vehicle toward the lateral rear sides thereof. The upper frame 2 is constituted from a hollow pipe having a rectangular cross section. Of course, the upper frame 2 may have any cross section, for example, a circular cross section other than the
25 rectangular cross section. Elastic cushions 5 are mounted around a front portion 2f of the upper frame 2, and portions 2s (hereinafter referred to as upper frame lateral portions) which both extend in a longitudinal direction. Further, handles 6 are removably mounted on
30 the rearmost portions of the upper frame lateral portions 2s. Although the shown handles 6 extend vertically upwards, the handles 6 may be provided extending toward any direction other than the vertical upward direction if necessary.

35 On the other hand, the lower frame 3 is generally U-shaped and extends from the front area of the vehicle toward the lateral rear sides thereof, similar to the

09869883-031701

upper frame 2, but the rear portions thereof are bent downwards and extend vertically downwards. In the following explanation, the portion which is horizontal relative to a surface of a floor and extends from the front area of the vehicle toward the lateral rear sides thereof is referred to as lower frame horizontal portion 3h, and the portion which extends vertically downwards is referred to as lower frame vertical portion 3v. Wheels 7, called free casters (hereinafter referred to as rear wheels), which can freely change their moving directions to any direction, are mounted on the lower ends of the lower frame vertical portions 3v. Further, means 8 for fixing the moving direction of the rear wheels 7, if necessary, is mounted on the lower ends of the lower frame vertical portions 3v. The moving direction fixing means 8 is a frame member having U-shape and mounted on the lower portions of the lower frame vertical portions 3v so that the member can rotate about a predetermined horizontal axis Ah. When the member 8 rotates downwards, the rear wheel 7 is introduced into the member 8, and thus the moving direction of the rear wheel 7 is fixed, for example, at the longitudinal direction. The lower frame 3 is constituted from a hollow pipe having a circular cross section, but may be constituted from a hollow pipe having any cross section, for example, oval cross section other than the circular cross section.

The connecting frames 4 have upper portions (hereinafter referred to as connecting frame upper portions) 4u and lower portions (hereinafter referred to as connecting frame lower portions) 4l. Each of these portions 4u and 4l is constituted from a hollow pipe having a circular cross section, but may be constituted from a hollow pipe having any cross section, for example, oval cross section other than the circular cross section. The upper ends of the connecting frame upper portions 4u are connected to generally central portions of the upper frame lateral portions 2s, and the connecting frame upper

09869883 081701

portions 4u extend downwards from the central portions of the upper frame lateral portions 2s where the upper ends of the connecting frame upper portions 4u is connected. The outer diameter of the connecting frame upper portion 4u is smaller than the inner diameter of the connecting frame lower portion 4l, and thus the lower end of the connecting frame upper portion 4u is inserted into the connecting frame lower portion 4l. As explained below in detail, the connecting frame upper portions 4u are slidably mounted on the connecting frame lower portions 4l.

The connecting frame lower portions 4l extend vertically downwards from its upper ends, and are bent horizontally forwards near the surface of the floor. In the following explanation, the portions of the connecting frame lower portions 4l which extend vertically downwards are referred to as vertical portions 4lv, and the portions which extend horizontally forwards are referred to as horizontal portions 4lh. Wheels 9, called free casters (hereinafter referred to as front wheels), which can freely change their moving directions to any direction, are mounted on the lower frontmost portions of the connecting frames 4 (that is, the frontmost portions of the horizontal portions 4lh of the connecting frame lower portions 4l).

Screw type fasteners 10 are provided around the upper ends of the connecting frame lower portions 4l. When the fastener 10 is rotated and released, the connecting frame upper portion 4u can be slid relative to the connecting frame lower portion 4l. On the other hand, when the fastener 10 is rotated and tightened, the connecting frame upper portion 4u is fastened relative to the connecting frame lower portion 4l by the end of the screw of the fastener 10. In this way, the connecting frame upper portion 4u is positioned at a desired position relative to the connecting frame lower portion 4l, and thus the upper frame 2 is positioned at a desired

09869883-081701

level from the floor.

The generally central portions of the lower frame horizontal portions 3h are connected to the vertical portions 4lv of the connecting frame lower portions 4l.

5 Therefore, the upper and lower frames 2 and 3 are connected by the connecting frames 4.

As the portion where the lower and connecting frames 3 and 4 are connected is referred to as frame connecting portion, a pair of left and right seat plate portions 1lp is mounted on the lower frame horizontal portions 3h at the rear side of the frame connecting portions. Each seat plate portion 1lp is mounted on the lower frame horizontal portion 3h so that the seat plate portion 1lp can pivot about the horizontal axis extending in the longitudinal direction. Each seat plate portion 1lp can pivot between a state where the seat plate portion extends vertically upwards (hereinafter referred to as vertical state) and a state where the seat plate portion extends horizontally inwards (hereinafter referred to as horizontal state), and can be positioned and fixed in the vertical or horizontal state. As shown in Fig.3, when the pair of the seat plate portions 1lp is positioned and fixed in the horizontal state, a seat plate 11 of the vehicle is constituted by the seat plate portions 1lp. Note that the selection of the vertical or horizontal state will be explained in detail below. Further, to allow easy understanding of the seat plate portions, in Fig.3, only the seat plate portions and the lower frame where the seat plate portions are connected are shown.

30 A pair of left and right foot plates 12 is mounted on the front and lower portions of the connecting frames 4, that is, on the horizontal portion 4lh of the connecting frame lower portion 4l. Each foot plate 12 is mounted on the horizontal portion 4lh of the connecting frame lower portion 4l so that the foot plate can pivot about the horizontal axis extending in the longitudinal direction. Each foot plate 12 can pivot between a state

09069883 081701

where the foot plate extends vertically upwards (hereinafter referred to as vertical state) and a state where the foot plate extends horizontally inwards (hereinafter referred to as horizontal state), and can be positioned and fixed in the vertical or horizontal state. The selection of the vertical or horizontal state will be explained in detail below.

The vehicle of the embodiment comprises means 13 for braking the movement of the vehicle. The braking means comprises a frame (hereinafter referred to as U-shaped frame) 13u having generally U-shape and extending from the front area of the vehicle to the lateral rear sides thereof, a pair of left and right bars (hereinafter referred to as vertical bars) 13v each connected to the generally central portion of the lateral portion of the U-shaped frame and extending vertically downwards, members 18g for slidably housing the vertical bars 13v and guiding the slide movement of the vertical bars 13v, and members (hereinafter referred to as grounding members) 13m each connected to the lower end of the vertical bar 13v. The rearmost portions of the U-shaped frame 13u are pivotably mounted on the lateral portions of the lower frame horizontal portions 3h. Further, the front portion of the U-shaped frame 13u is connected to the front portion of the lower frame horizontal portion 3h via biasing means such as a coil spring 14. In addition, an engagement plate 15 is mounted on the front portion of the lower frame horizontal portion 3h, which plate 15 engages the front portion of the U-shaped frame 13u to maintain the U-shaped frame 13u at an upper position.

When the front portion of the U-shaped frame 13u is engaged with the engagement plate 15 against the biasing force of the spring 14, the grounding members 13m are maintained at a position raised upwards from the surface G of the floor. When the upper end of the engagement plate 15 is withdrawn rearwards, and thus is bent, the

09869883-081701

front portion of the U-shaped frame 13u is released from the engagement plate 15, and thus the U-shaped frame 13u is withdrawn downwards by the biasing force of the spring 14, and then the vertical bars 13v are guided by the
5 guide means 13g and move downwards, and then the grounding members 13m contact the surface G of the floor. In this way, the vehicle is braked. According to this, the performance of braking the vehicle is high since the vehicle is braked simultaneously at both sides thereof.
10 Further, the braking means of this embodiment does not exert a braking force directly to the front and rear wheels 9 and 7, so the vehicle can be braked using the braking means having relatively simple mechanism of the invention even if free casters are used as the front and
15 rear wheels 9 and 7. That is, a mechanism more complicated than that of the braking means of the invention is necessary to exert the braking force directly to the free casters, but according to the invention, the vehicle can be braked by a relatively
20 simple mechanism.

Advantages of the above explained vehicle will be explained in the below.

In the above explained vehicle, a person (hereinafter referred to as user) using the vehicle can
25 stand within a space surrounded by the upper, lower and connecting frames 2, 3 and 4, and can walk with the vehicle, leaning the user's body on the upper frame 2, or leaning the user's hand on the upper frame 2. According to this, a user with disabled legs can walk or be
30 rehabilitated. Note that the seat plate portions 11p are positioned in the vertical state when the user walks using the vehicle. That is, when the user walks using the vehicle, the seat plate portions 11p are removed from an area (hereinafter referred to as leg moving area)
35 where the legs of the walking user move. According to this, the user can walk without being interrupted by the seat plate portions 11p. Further, when the user becomes

09869883 "081701
FD/780" 58859860

5 In this way, the user can rest by sitting on the seat plate 11 formed by the seat plate portions 11p.

That is, the foot plates 12 are removed from the leg
10 moving area. According to this, the user can walk

15 user can rest, putting the user's feet on the foot plates
12.

20 who cannot walk by the user (hereinafter referred to as
person in need of help) to the destination, a person

25 vehicle to move the same to carry the person in need of
help to the destination.

30 spaced from each other. In addition, the width between
the horizontal portions of the connecting frame lower
portions 41 is larger than that of a standard sitting

35 level of the front portion 3f of the lower frame
horizontal portion 3h is higher than that of the seat of
the standard stool T. According to this, when the user

5 Further, in the above vehicle, the level of the seat plate portions 11p, when the seat plate portions 11 are projected into the leg moving area to come into a horizontal state, is higher than the level of the seat of the standard stool T. According to this, the seat plate portions 11p are maintained above the stool T. Further, as will be understood with reference to fig.3, a space is formed between the seat plate portions 11p when the seat plate portions 11p are projected into the leg moving area to come into the horizontal state. Therefore, the user can use the vehicle, sitting on the seat plate 11 with the seat plate portions 11p being maintained above the stool T.

30 Further, it is advantageous that the upper frame 2 can be easily replaced with an upper frame having a different shape. According to this, the upper frame 2 having the optimum shape can be selected, depending on the shape of the body of the user, and can be connected to the connecting frame 4, and then the user can use the vehicle.

35 Arrangements shown in Figs.4-11 can be employed as a seat plate having advantages similar to those explained above. In an embodiment shown in Fig.4, a pair of seat

plate portions 11p is provided in front of the frame connecting portion between the lower frame 3 and the connecting frame 4 so that the seat plate portions 11p can pivot about the horizontal axis extending in the longitudinal direction. In an embodiment shown in Fig.5, two pairs of seat plate portions 11p are provided at the rear of the frame connecting portion so that the seat plate portions 11p can pivot about the horizontal axis extending in the longitudinal direction. In an embodiment shown in Fig.6, a pair of seat plate portions 11p is provided at the rear of the frame connecting portion so that the seat plate portions 11p can pivot about the horizontal axis extending in the longitudinal direction, but no space is formed between the seat plate portions 11p when the seat plate portions 11p are positioned to extend horizontally inwards. In an embodiment shown in Fig.7, a seat plate 11 is mounted on one of the horizontal portions of the lower frame 3 at the rear of the frame connecting portion so that the seat plate 11 can pivot about a horizontal axis extending in the longitudinal direction. In an embodiment shown in Fig.8, a pair of seat plate portions 11p is provided in front of the frame connecting portion and a pair of seat plate portions 11p is provided at the rear of the frame connecting portion so that the seat plate portions can pivot about a horizontal axis extending in the longitudinal direction.

In an embodiment shown in Fig.9, a pair of seat plate portions 11p is provided at the rear of the frame connecting portion, but the seat plate portions 11p are mounted on the horizontal portions of the lower frame 3 so that the seat plate portions 11p can pivot about a vertical axis v. In an embodiment shown in Fig.10, a pair of seat plate portions 11p is provided at the rear of the frame connecting portion and is fixed on the lower frame horizontal portion 3h and the lower frame horizontal portion 3h can pivot about a vertical axis v.

09869887-081701

5

10

15

20

30

35

seat plate 11 with the back seat plate in the horizontal state, the level of the seat surface where the user sits is higher than that of the seat surface when the seat plate portions 11a are used as the seat plate 11 with the back seat plate being in the vertical state.

Further, when a process for providing waterproof characteristics is applied to the entire of the vehicle, the vehicle of the invention can be used as a supporting device when the user takes a shower.

Further, aluminum can be used as a material for forming the frames, but the user of the vehicle leans the user's weight on the frames when the user walks, so the stability of the vehicle is high when the weight of the frames is relatively heavy, and therefore, in order to avoid a risk of user falling down, iron is preferable. Of course, any material for forming the frames can be employed depending on the necessity and, for example, the frames may be formed of a plastic material.

09869883-081701